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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,670	02/21/2001	Hartvig W.J. Ekner	12135-006001/0113.00US	6040

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EXAMINER

DO, CHAT C.

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 08/13/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/788,670

Applicant(s)

EKNER ET AL

Examiner

Chat C. Do

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/21/01; 8/17/01; 4/23/01; 5/9/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because the abstract is too short. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities:

The applicant is advised to update the information cited in the cross-reference to related application section in the specification.

The applicant is advised to remove the line "40047528.doc" in the abstract page. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 1-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the limitations “an arithmetic multiplier” and “a binary polynomial multiplier” as cited are unclear whether the arithmetic multiplier and a binary polynomial multiplier are the same unit by utilizing the common components or the arithmetic multiplier and a binary polynomial multiplier are two separate multiplier within a single multiplier. Based on the specification, the examiner considers these limitations of the arithmetic multiplier and a binary polynomial multiplier as same unit using the common components. Claims 15 and 29 have the same problem.

Thus, claims 2-14, 16-28, and 30-42 are also rejected for being dependent on the rejected base claims 1, 15, and 29 respectively.

Re claim 14, the limitation “permutation logic” is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For examination purposes, the examiner disregards this limitation. Claims 28 and 42 have the same problem.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 1-2, 6, 9-13, 15-16, 20, 23-27, 29-30, 34, and 37-41 are rejected under 35

U.S.C. 102(b) as being anticipated by Dieffenderfer et al. (U.S. 5,734,600).

Re claim 1, Dieffenderfer et al. disclose in Figures 2-3 a multiply unit (abstract) comprising: at least one input data path (310 and 326) for receiving one or more input operands (MR and MD as multiplier and multiplicand) to the multiply unit; an arithmetic multiplier (314 and 318) connected to receive the one or more input operands (MD and encoded MR); a binary polynomial multiplier (314 and 318, col. 1 lines 5-9, and col. 2 lines 40-42) connected to receive the one or more input operands (MD and encoded MR); and a multiply unit output data path (output of 320) connected to receive an output of the arithmetic multiplier (314 and 318) and connected to receive an output of the binary polynomial multiplier (314 and 318).

Re claim 2, Dieffenderfer et al. further disclose in Figures 2-3 the arithmetic multiplier includes a multiplier array (112).

Re claim 6, Dieffenderfer et al. further disclose in Figures 2-3 comprising Booth recoding logic.

Re claim 9, Dieffenderfer et al. further disclose in Figures 2-3 the binary polynomial multiplier includes a binary polynomial multiplication array (col. 1 lines 5-10).

Re claim 10, Dieffenderfer et al. further disclose in Figures 2-3 the binary polynomial multiplier (abstract) includes a polynomial multiplication array having a first input (MR) and a second input (MD), the polynomial multiplication array including: a plurality of row multipliers (314) that multiply the first input by a bit of the second input;

and at least one adder (318 and 320) for computing a result by adding the results from the plurality of row multipliers.

Re claim 11, Dieffenderfer et al. further disclose in Figures 2-3 the at least one adder performs a bitwise exclusive-or on the results from the plurality of row multipliers (318).

Re claim 12, Dieffenderfer et al. further disclose in Figures 2-3 at least one of the plurality of row multipliers performs multiplication by computing a logical AND of the first input and a bit of the second input (col. 10 lines 31-40).

Re claim 13, Dieffenderfer et al. further disclose in Figures 2-3 comprising an accumulator, and wherein the at least one adder computes a result by adding the results from the plurality of row multipliers and the accumulator (feedback to the mux 322).

Re claim 15, it is a processor claim of claim 1. Thus, claim 15 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 16, it is a processor claim of claim 2. Thus, claim 16 is also rejected under the same rationale in the rejection of rejected claim 2.

Re claim 20, it is a processor claim of claim 6. Thus, claim 20 is also rejected under the same rationale in the rejection of rejected claim 6.

Re claim 23, it is a processor claim of claim 9. Thus, claim 23 is also rejected under the same rationale in the rejection of rejected claim 9.

Re claim 24, it is a processor claim of claim 10. Thus, claim 24 is also rejected under the same rationale in the rejection of rejected claim 10.

Re claim 25, it is a processor claim of claim 11. Thus, claim 25 is also rejected under the same rationale in the rejection of rejected claim 11.

Re claim 26, it is a processor claim of claim 12. Thus, claim 26 is also rejected under the same rationale in the rejection of rejected claim 12.

Re claim 27, it is a processor claim of claim 13. Thus, claim 27 is also rejected under the same rationale in the rejection of rejected claim 13.

Re claim 29, it is a computer-readable medium claim of claim 1. Thus, claim 29 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 30, it is a computer-readable medium claim of claim 2. Thus, claim 30 is also rejected under the same rationale in the rejection of rejected claim 2.

Re claim 34, it is a computer-readable medium claim of claim 6. Thus, claim 34 is also rejected under the same rationale in the rejection of rejected claim 6.

Re claim 37, it is a computer-readable medium claim of claim 9. Thus, claim 37 is also rejected under the same rationale in the rejection of rejected claim 9.

Re claim 38, it is a computer-readable medium claim of claim 10. Thus, claim 38 is also rejected under the same rationale in the rejection of rejected claim 10.

Re claim 39, it is a computer-readable medium claim of claim 11. Thus, claim 39 is also rejected under the same rationale in the rejection of rejected claim 11.

Re claim 40, it is a computer-readable medium claim of claim 12. Thus, claim 40 is also rejected under the same rationale in the rejection of rejected claim 12.

Re claim 41, it is a computer-readable medium claim of claim 13. Thus, claim 41 is also rejected under the same rationale in the rejection of rejected claim 13.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3-5, 17-19, and 31-33 are rejected under 35 U.S.C. 103(a) as being obvious over Dieffenderfer et al. (U.S. 5,734,600) in view of Zhang et al. (U.S. 5,944,776).

Re claim 3-5, Dieffenderfer et al. do not disclose in Figures 2-3 the multiplier array is a Wallace tree multiplier array including a plurality of carry-save adder structure. However, Zhang et al. disclose in Figure 3 the multiplier comprising a multiplier array is a Wallace tree including a plurality of carry-save adder structure (308). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a Wallace tree multiplier array including a plurality of carry-save adder structure as seen in Zhang et al.'s Figure 3 into Dieffenderfer et al.'s invention because it would enable to simplify the circuitry and increase the system performance by compressing using carry-save to produce sum and carry rows for yielding the final product.

Re claim 17, it is a processor claim of claim 3. Thus, claim 17 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 18, it is a processor claim of claim 4. Thus, claim 18 is also rejected under the same rationale in the rejection of rejected claim 4.

Re claim 19, it is a processor claim of claim 5. Thus, claim 19 is also rejected under the same rationale in the rejection of rejected claim 5.

Re claim 31, it is a computer-readable medium claim of claim 3. Thus, claim 31 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 32, it is a computer-readable medium claim of claim 4. Thus, claim 32 is also rejected under the same rationale in the rejection of rejected claim 4.

Re claim 33, it is a computer-readable medium claim of claim 5. Thus, claim 33 is also rejected under the same rationale in the rejection of rejected claim 5.

10. Claims 7-8, 21-22, and 35-36 are rejected under 35 U.S.C. 103(a) as being obvious over Dieffenderfer et al. (U.S. 5,734,600) in view of Magar (U.S. 4,538,239).

Re claims 7, Dieffenderfer et al. do not disclose in Figures 2-3 the arithmetic multiplier performs 32-bit by 16 bit multiplications in a two clock cycles. However, Magar disclose in 3 that an arithmetic multiplier performs 16x16 multiplications in a two clock cycles back in 1985. As the technology improve, more multiplications can be processed in less cycles. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to perform 32x16 multiplications in a two clock cycles because it would enable to improve the system performance.

Re claim 8, Dieffenderfer et al. do not disclose in Figures 2-3 the arithmetic multiplier performs 32-bit by 32 bit multiplications in three clock cycles. However, Magar disclose in 3 that an arithmetic multiplier performs 16x16 multiplications in a two clock cycles back in 1985. As the technology improve, more multiplications can be

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processed in less cycles. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to perform 32x32 multiplications in a three clock cycles because it would enable to improve the system performance.

Re claim 21, it is a processor claim of claim 7. Thus, claim 21 is also rejected under the same rationale in the rejection of rejected claim 7.

Re claim 22, it is a processor claim of claim 8. Thus, claim 22 is also rejected under the same rationale in the rejection of rejected claim 8.

Re claim 35, it is a computer-readable medium claim of claim 7. Thus, claim 35 is also rejected under the same rationale in the rejection of rejected claim 7.

Re claim 36, it is a computer-readable medium claim of claim 8. Thus, claim 36 is also rejected under the same rationale in the rejection of rejected claim 8.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 6,513,054 to Carroll discloses an asynchronous parallel arithmetic processor utilizing coefficient polynomial arithmetic (CPA).
- b. U.S. Patent No. 4,868,777 to Nishiyama et al. disclose a high speed multiplier utilizing signed digit and carry save operands.
- c. U.S. Patent No. 5,280,439 to Quek et al. disclose an apparatus for determining Booth recoder input control signals.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Chat C. Do
Examiner
Art Unit 2124

August 7, 2003



**CHUONG DINH NGO
PRIMARY EXAMINER**